MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2015/2016

TCS2411/TSE2101 - SOFTWARE ENGINEERING FUNDAMENTALS

(All Sections/Groups)

15th October 2015
2.30pm - 4.30pm
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **FIVE** printed pages, including the cover page. Attempt **FIVE** out of six questions.

2. The mark distribution for each question is given.

3. Please write all your answers in the answer booklet provided.

QUESTION 1

(a) Different software would have different key characteristics that a software engineer must ensure when developing a software product. Explain, with suitable examples, the following software applications and specify the key characteristics for each one:

- System software
- Embedded software

[4 marks]

(b) Examine the following project:

Activity	Immediate Predecessor	Duration (days)
A	-	8
B	-	5
C	A,G	3
D	C	7
E	F,H	6
F	C	4
G	B	2
H	B	3

Draw the network diagram (Activity On Arrow), and find the critical path of this project.

[6 marks]

QUESTION 2

ICT Consultants is a specialised training centre that provides training for corporate customers. It runs its business at a three-storey building in Cyberjaya where the administration is done at the ground floor and the training classes are conducted at the upper floors. The company employs full-time consultants to teach fundamental courses and part-time consultants to teach specialised courses based on requirements.

The company is interested to purchase a computerised system to support the following basic processes:

- Registration of new customers
- Registration of customers to classes
- Payment of fees
- Generation of customers and fees reports

The system is to be implemented through a few networked computers at the ground floor of the training centre, while computers in the classrooms are used to display training schedules, take attendance and record the teaching hours of part-time consultants.

Continued...

(a) Draw the use case diagram to illustrate the system. Explain any assumptions that you have made to complete the diagram.

[5 marks]

(b) What is a CRC model? Describe how you can use CRC modelling to identify the classes in the system.

[5 marks]

QUESTION 3

(a) What is 'Refactoring' with respect to software engineering? [1 mark]

(b) When software is refactored, the existing design is examined for redundancy or unused design elements. Identify three other items the existing design is being examined for during refactoring. [1.5 marks]

(c) The overall complexity of a proposed architecture is assessed by considering three dependencies between components within it. List and describe these three dependencies. [3 marks]

(d) Draw a context diagram to represent an 'Online Shopping System' with three sources or sinks, namely the Administrator, User, and Technical Support. The diagram should show the flows of data or information between the system and the three entities. For example, when the User logs in to the system, the system will respond with Users' updated information. Administrator updates information in the system. The system will provide management reports to the Administrator. If the system encounters problem, it will send the feedback to the Technical Support staff who will then resolve the problem or fix the system errors.

[4.5 marks]

QUESTION 4

(a) Consider the decision table below (Figure 1). Transform the six rules into pseudo codes (Rule 1-6) where each rule is displayed in the following format:

Rule 0: IF customer-type = 'regular' THEN discount = 0;

[6 marks]

Legend: T = True, F = False ✓ indicates the particular action is selected.

Assumption: Additional discount, x = 5%.

Continued...

	Rules					
Conditions	1	2	3	4	5	6
regular customer	T	T				
silver customer			T	T		
gold customer					T	T
special discount	F	T	F	T	F	T
Actions						
no discount	✓					
apply 8 percent discount			✓	✓		
apply 15 percent discount					✓	✓
apply additional x percent discount		✓		✓		✓

Figure 1

(b) In Object Oriented (OO) point of view, a component contains a set of collaborating classes. What does a component contain in the conventional point of view? [1.5 marks]

(c) Refer to the following state transition diagram (Figure 2) for a switch. Identify four valid state transitions and give an example of invalid state transition. [2.5 marks]

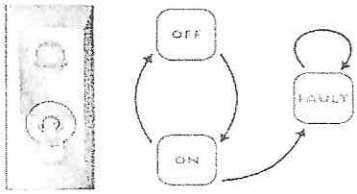

Figure 2

QUESTION 5

a)

"Web-based systems and applications reside on a network and interoperate with many different operating systems, browsers (residing on a variety of devices), hardware platforms, communications protocols, and 'backroom' applications, the search for errors represents a significant challenge."

Cited from textbook: "Software Engineering: A Practitioner's Approach" by Roger Pressman.

Based on the statement above, as a software consultant, you have to conduct a software testing for a Web-based system. Elaborate on the testing strategy that you think is important to be conducted and testing techniques that can be applied for this type of system. [6 marks]

Continued...

b) Describe any four configuration items for a web-based application.

[4 marks]

QUESTION 6

(a) Briefly describe how regression testing is conducted. Give two reasons why regression testing plays an important role in integration testing procedure.

[4 marks]

(b) Formal technical review is a software quality assurance mechanism. State two objectives of conducting a formal technical review. [2 marks]

(c) Provide any two benefits of Integrated Case (I-CASE). [4 marks]

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